Amendments to the Claims:

The Listing of the Claims below shall replace all previous listings of the claims.

Listing of the Claims

1. (Currently Amended) A system for sound cancellation comprising:

a source microphone for detecting sound propagating from a mobile sound source remote from the source microphone;

a source localizing sensor for determining a current location of the sound source;

at least two speakers configured to direct a canceling sound toward a mobile cancellation location that is spatially remote from the sound source and the speakers,

a cancellation space localizing sensor for determining a current location of the mobile cancellation space; and

a computational module in communication with the source microphone, the source localizing sensor, the speakers, and the cancellation space localizing sensor, the computational module including a memory storing a situational transfer function of individual transfer functions, each individual transfer function corresponding to at least a sound source location and a cancellation space location, the computational module configured to receive a signal from the microphone, to identify at least one current individual transfer function corresponding to the current location of the sound source and the current location of the cancellation location, and to control the speakers to transmit a cancellation sound signal based on the at least one current individual transfer function to the speakers, wherein the situational transfer function includes a situational transfer matrix function, **W**,

$$\mathbf{W} = 1/(\mathbf{d}-\mathbf{c}*\mathbf{e})$$

wherein **c** is a transfer function for sound propagation from the sound source to the source microphone, **e** is a transfer function for sound propagation from the speaker to the cancellation location, and **d** is a transfer function for sound propagation from the source microphone to the speaker, and the * operator denotes mathematical convolution.

2. (Original) The system of Claim 1, further comprising a training sub-system having at least one training microphone that can be placed at the cancellation location.

3. (Previously Presented) The system of Claim 1, further comprising a sound velocity and/or temperature sensor in communication with the computational module, wherein the predetermined adaptive filtering function is responsive to the temperature of the acoustic environment.

4. (Previously Presented) The system of Claim 2, wherein the situational transfer function is determined by receiving a first sound input from the source microphone, receiving a second sound input from the training microphone, and then determining the situational transfer function, wherein the predetermined adaptive filtering function is adaptive to a sound transformation between the source microphone signal and the training microphone signal.

5. (Previously Presented) The system of Claim 1, wherein the situational transfer function comprises a function that identifies a sound transformation between the source microphone and the cancellation location without contemporaneous sound receiving at the cancellation location.

6. (Cancel)

7. (Original) The system in Claim 1, wherein the source microphone comprises a plurality of source microphones.

8.-13. (Canceled)

14. (Original) The system of Claim 1, wherein the speaker is a parametric speaker for broadcasting ultrasonic sound, the parametric speaker configured to broadcast a

localized cancellation sound at the cancellation location.

15. (Original) The system of Claim 1, wherein the speaker comprises a plurality of speakers.

16.-17. (Canceled).

18. (Currently Amended) A method of sound cancellation comprising:

detecting a sound input at an input location that is spatially remote from a sound source, the sound input including undesirable sound propagating from a mobile sound source remote from the input location;

determining a current location of the mobile sound source;

determining a current location of a mobile cancellation space;

providing a plurality of locations-dependent situational transfer functions, each transfer function corresponding to at least a sound source location and a cancellation space location;

identifying a current situational transfer function corresponding to the current location of the sound source and the current location of the cancellation space; and

broadcasting a cancellation sound based on the sound input and the current individual transfer function of the situational transfer function for reducing sound proximate the cancellation location, wherein the situational transfer function includes a situational transfer matrix function, **W**,

$$\mathbf{W} = 1/(\mathbf{d}-\mathbf{c}*\mathbf{e})$$

wherein **c** is a transfer function for sound propagation from the sound source to the source microphone, **e** is a transfer function for sound propagation from the speaker to the cancellation location, and **d** is a transfer function for sound propagation from the source microphone to the speaker, and the * operator denotes mathematical convolution.

19. (Previously Presented) The method of Claim 18, further comprising training an algorithm to provide the situational transfer function.

20. (Previously Presented) The method of Claim 19, wherein the training algorithm comprises the steps of:

detecting a first sound at a first location;

detecting a modified second sound at a second location, the modified second sound being a result of sound propagating from the first location to the second location; and

determining the situational transfer function, the situational transfer function approximating the second modified sound from the first sound.

21. (Original) The method of Claim 20, further comprising obtaining a second signal using a training system comprising at least one microphone, the training system being at least one of: head-wearable device and positionable at desired location of cancellation.

22. (Original) The method of Claim 21, further comprising providing a training device comprising a head surrogate comprising a three dimensional object and at least one microphone.

23. (Original) The method of Claim 18, further comprising analyzing the sound input for medical screening purposes.

24. (Previously Presented) The method of Claim 18, wherein providing a situational transfer function of individual transfer functions comprises:

detecting first sound at a first location;

detecting a modified second sound at a second location, the modified second sound being a result of sound propagating to the second location;

determining an adaptive filtering function substantially removed of cross talk to provide a cancelling sound for cancelling the second sound;

halting detecting of the modified sound; and

determining a cancellation signal proximate the second location from the first sound and the adaptive filtering function.

25. (Previously Presented) The method of Claim 18, wherein providing a situational transfer function of individual transfer functions comprises:

detecting a first sound at a first location;

detecting a modified second sound at a second location, the modified second sound being a result of sound propagating to the second location; and

determining an individual transfer function based on the first and second location, the individual transfer function approximating the second modified sound from the first sound without requiring additional sound ~~input from~~ detecting at the second location.

26. (Previously Presented) The method of Claim 18, further comprising:

analyzing a sound input to determine if a change in respiratory sounds occurs sufficient to identify a health condition comprising at least one of: sleep apnea, pulmonary congestion, pulmonary edema, asthma, halted breathing, abnormal breathing, arousal, and disturbed sleep.

27. (Previously Presented) The system of Claim 1 further comprising:

a parametric speaker configured to transmit a canceling sound configured to cancel the detected sound such that the canceling sound is localized with respect to the cancellation location.

28. (Original) The system of Claim 27, wherein the parametric speaker produces the canceling sound with an interaction between two or more ultrasonic signals.

29. (Original) The system of Claim 27, wherein the parametric speaker produces

the canceling sound by nonlinear interaction of an ultrasonic signal with air.

30. (Canceled)

31. (Previously Presented) The method of Claim 18, wherein broadcasting a cancellation sound further comprises:

transmitting a canceling signal from a parametric speaker that locally cancels the sound with respect to a cancellation location.

32. (Original) The method of Claim 31, wherein transmitting a canceling signal further comprises transmitting a plurality of ultrasonic signals wherein the canceling signal is formed from the interaction of the plurality of ultrasonic signals.

33. (Original) The method of Claim 31, wherein the canceling signal is formed from a nonlinear interaction of an ultrasonic signal with air.

34. (Original) The method in Claim 31 wherein the canceling signal is formed from an interaction between a plurality of ultrasonic signals that creates a difference signal among the ultrasonic signals at the cancellation location.

35. (Original) The method in Claim 31 wherein the ultrasonic signal comprises a carrier frequency component and a modulation component and nonlinear interaction between the carrier frequency component and the modulation component in air creates a cancellation sound by demodulation of the ultrasonic signal that is in a generally audible frequency range along the propagation path of the ultrasonic signal.

36. (Canceled)

37. (Previously Presented) The system of Claim 1, wherein the sound source

comprises a snoring individual and the speaker spaced apart from the snoring individual.

38. (Canceled)

39. (Previously Presented) The system of Claim 1, wherein the situational transfer function is determined using convolution of the individual transfer functions, and each of the individual transfer functions is configured to characterize propagation of sound with respect to a pair of spaced apart transducers comprising at least one of a speaker, a microphone and/or a velocimeter.

40. (Canceled)

41. (Previously Presented) The method of Claim 18, wherein the situational transfer function is determined using convolution of the individual transfer functions, and each of the individual transfer functions is configured to characterize propagation of sound with respect to a pair of spaced apart transducer.

42. (Previously Presented) The system of Claim 1, wherein the at least two speakers are stationary.

43. (Previously Presented) The system of Claim 2, wherein the at least one training microphone is configured to be removed from the cancellation space during transmission of the cancellation signal.

44. (Previously Presented) The system of Claim 1, wherein the situational transfer function comprises a locations-representative situational transfer function representative of a sound source location and a cancellation location.

45. (Previously Presented) The system of Claim 1, wherein the situational transfer function is provided by convolution of individual transfer functions representative of sound propagation between individual speakers, microphones and/or locations.

46. (Previously Presented) The system of Claim 45, wherein the situational transfer function comprises at least one individual transfer function representative of cross talk between the speakers and the microphone.

47. (Previously Presented) The system of Claim 4, wherein the received first sound input comprises undesirable sound from at least one cancellation speaker.

48. (Previously Presented) The method of Claim 18, wherein the situational transfer function is provided by a mathematical convolution of a plurality of individual transfer functions.

49. (Previously Presented) The method of Claim 18, wherein the individual transfer functions are representative of at least one sound propagation path comprising: from the sound source to at least one sound source microphone, from the sound source to at least one training microphone, from at least one speaker to at least one training microphone, from at least one speaker to at least one cancellation location, and/or from at least one speaker to at least one sound source microphone being representative of cross talk.

50. (Previously Presented) The method of Claim 20 wherein the training algorithm is provided by determining and mathematically convolving individual transfer functions representing the plurality of sound propagation paths among the source location, the cancellation location, the microphones and the speakers.

51. (Previously Presented) The system of Claim 38, wherein the individual transfer functions are representative of cross talk and are invariant among the plurality of situational transfer functions.

52. (Previously Presented) The method of Claim 40, wherein the situational transfer matrix function includes the individual transfer functions, each individual transfer function being representative of the locations of a snorer and bed partner ears and used selectively to generate a cancellation representative of the locations of the snorer and bed partner ears.

53. (Previously Presented) The system of Claim 2, wherein the at least one training microphone is deployed, together with one of a head-shaped unit, in a position substantially corresponding to a human ear.

54. (Previously Presented) The system of Claim 1, wherein the individual transfer function includes a cross-talk cancellation feature to reduce a feedback effect of the canceling sound detected by the source microphone.